Idaho Currents

State Energy Offices Test Puron Refrigerant In Homes

Heat pumps are one of the most energy-efficient systems used to heat and cool homes, but can have problems in both heating and cooling modes. The Energy Division is studying the performance of heat pumps and air conditioners using the new Puron® refrigerant.

The research, funded by the National Association of State Energy Officials and U.S. Department of Energy, is one of 11 projects selected from 65 proposals, says Ken Eklund, principal energy specialist with the Energy Division.

The project brings together the energy offices in Idaho, Oregon and Washington with Bonneville Power Administration, the Energy Trust of Oregon, and the Northwest Power Planning Council. The purpose of the project is to research the performance of heat pumps using Puron and to develop training and installation procedures to maximize their operation.

Energy Star homes

"As part of the project, six Energy Star® homes with high performance heat pumps are being monitored for an entire heating and cooling season to see how they perform when installed," says Eklund. "Five of the homes' heat pumps use Puron as the refrigerant and the sixth home uses Freon in the heat pump."

"In addition, Purdue University will test three heat pumps in the lab to find out how they heat and cool under ideal conditions," Eklund says.

The Energy Division is managing this project for the entire region and has subcontracts with Ecotope, Inc., the technical contractor, and Washington State University Energy Program.

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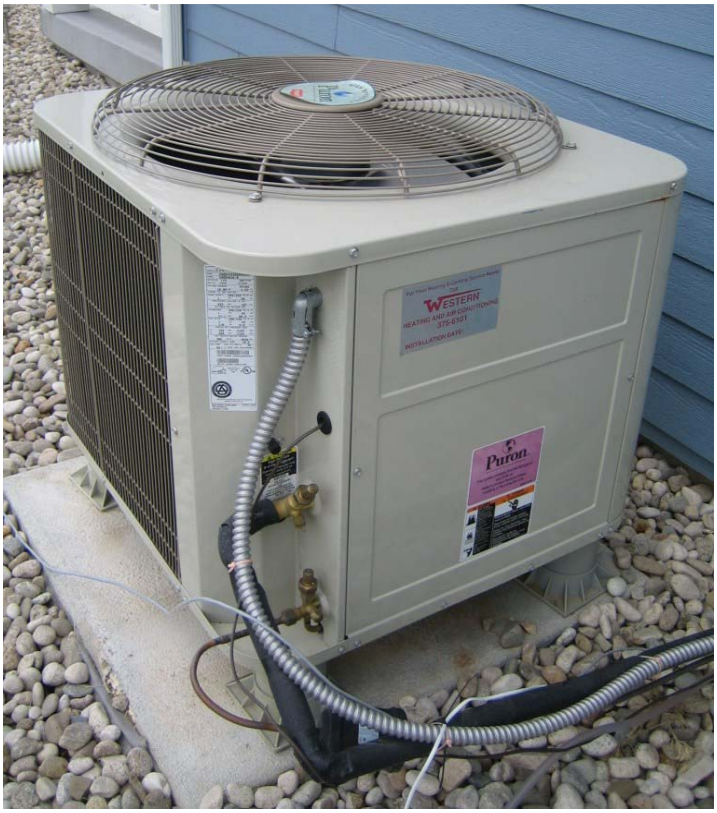

This 3 ton, two-stage heat pump uses Puron refrigerant to heat and cool a 2,713-square-foot Boise home as part of a performance study in three northwest states. (Photo by Bob Davis, Ecotope, Inc.)

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The information gained will be used to develop and fine-tune software that can tell how a heat pump or air conditioner should perform on any specific home. This will allow the Energy Division to provide better technical assistance to Energy Star homeowners. Additionally, a refined system installation training and testing procedure for installers will also be developed from this data as part of the project.

Each energy office is responsible for recruiting two homes to monitor – one in a warmer climate and the other in a colder climate in that state. Of the six homes, the one owned by a Boise couple is of special interest, because it is in the hottest part of the Pacific Northwest and will produce crucial data about air conditioners.

Three months of data

Monitoring equipment was installed in the Boise home in late June, and has been collecting data every few minutes since then. Initial results show that it's important to have a new system commissioned after its been installed.

Commissioning is a method of ensuring that a building's (or home's) heating and cooling systems meet the design intent and the owner's needs. A Home Performance Specialist or a performance tested certified heating, ventilating and air conditioning technician may perform commissioning. These people have been specially trained and have a Performance Tested System agreement with the Energy Division.

"Of the six homes monitored, only the system in the Boise home was installed properly and performed to the manufacturer's performance criteria," says Eklund. "These systems were picked at random and are all over the region. The same percentage of properly working systems was seen in a previous study as well, so we know improper installation is a significant problem.

"The majority of the systems have serious installation problems, but can work very well if installed and commissioned properly," Eklund adds. "A large part of the problems appear to be with complex control systems that installers don't understand."

Other data results

The heat pump in the Boise home performed well this summer with a Coefficient of Performance of 3.5 – meaning three and one-half times as much energy was removed from the home as went into its operation. By contrast, the system monitored in Bend, Oregon, had a COP of less than 2.

As cold weather approaches, the Energy Division will learn more about the test homes scattered throughout the region. *Idaho Currents* will follow their performance as data is collected and analyzed.

Freon Vs. Puron

The term "refrigerant" means any Class II substance used for heat transfer in a refrigerating system, according to the U.S. Environmental Protection Agency. Refrigerant is the gas used to heat or cool the air in heat pumps and air conditioners. Without refrigerant, these appliances would operate only as fans.

Most residential air conditioners and heat pumps rely on hydrochloroflurocarbons, or HCFCs, for this purpose. The one most often used is called HCFC-22, or R-22, known as Freon®.

About 10 years ago, the federal Clean Air Act was amended to begin a mandatory phase out of the production and use of many ozone-depleting substances, including R-22 and R-12, which is found in vehicle air conditioning. Products using R-22 will be phased out by Jan. 1, 2010, and a total ban on production and importation becomes effective in 2020.

Puron® is a brand name for a refrigerant called R-410A. Several air conditioning and heat pump manufacturers are starting to use Puron in their products because it's reported to be nonflammable, generally viewed as nontoxic, and has less impact on atmospheric ozone.

DOE Promotes 'Change-A-Light' Campaign

Have You Made 'The Switch'?

It's such an easy way to save energy, but many people haven't made "The Switch."

The switch to what? To energy-efficient compact fluorescent light bulbs. In conjunction with Energy Awareness Month, the U.S. Department of Energy and the U.S. Environmental Protection Agency kicked off the annual "Change-a-Light, Change-the-World" campaign the first week of October.

As part of the campaign, DOE Secretary of Energy Samuel W. Bodman has challenged all 120,000 DOE employees and all Americans to replace at least one traditional light bulb with a CFL bulb at home.

The campaign, which runs from Oct. 4 to Nov. 30, encourages U.S. residents to replace a conventional bulb or fixture in their home or workplace with one that has earned the government's Energy Star label for energy efficiency.

"Taking small and easy steps, such as replacing light bulbs with newer efficient compact fluorescent bulbs can add up to real, substantive savings," says Bodman.

If every U.S. household changed a single light bulb to an Energy Star bulb, it would save enough power to light more than 2.5 million homes.

If everyone at DOE (120,000 employees) changed one light bulb, it would save enough energy to light 3,065 homes for a year, would reduce carbon dioxide emissions equal to removing 886 cars from our parking lots, and would have the same effect as planting 1,260 acres of trees, says DOE.

Energy Awareness Month

This year's theme is "Energy Independence Depends on US – Choose Wisely, Use Wisely." The theme, set by DOE, emphasizes the impact that our energy choices and use can have on securing U.S. energy independence.

As part of the month, DOE encourages the public to use products displaying the Energy Star label because they save energy and prevent greenhouse gas emissions by meeting strict energy efficiency guidelines set by EPA and DOE.

How can you participate in Energy Awareness Month? The Idaho Energy Division has a handy booklet packed with tips on how to save energy. Call the Idaho Energy Hotline, **1-800-334-SAVE**, and ask for your free copy.

You May Qualify For Tax Credits

Consumers who have made energy improvements in their homes since Jan. 1, 2006, may qualify for federal tax credits when they file their income tax forms next spring. The tax credits are part of the Energy Policy Act of 2005.

Tax credits are available for many types of home improvements, including adding insulation, replacing windows, and upgrading certain high efficiency heating and cooling equipment. The maximum amount of homeowner credit for all improvements combined is $500 during the two-year period ending Dec. 31, 2007.

Tax credits are also available for people who purchase hybrid gasoline-electric, diesel, battery-electric, alternative fuel and fuel cell vehicles. The tax credit amount is based on a formula determined by vehicle weight, technology, and fuel economy compared to base year models.

Qualified solar water heating and photovoltaic systems may also qualify for tax credits. The credits are available for systems "placed in service" in 2006 and 2007 for 30 percent of the cost of the system, up to $2,000. This credit is not limited to the $500 home improvement cap.

For more information on the Federal Tax Credit, talk to your tax consultant or an Internal Revenue Service representative.

Treasure Valley Joins Clean Cities Coalition

In an effort to help promote alternative fuels, the Treasure Valley was designated a partner in the Clean Cities Coalition in August by the U.S. Department of Energy.

Clean Cities is a DOE program designed to advance the nation's economic, environmental, and energy security by promoting alternative fuels and adopting local practices that contribute to the reduction of petroleum consumption. It is open to any geographic area willing to make a commitment to alternative fuels.

The Treasure Valley joins more than 80 volunteer coalitions and 4,800 stakeholders across the country. The Clean Cities Program met its original goal of displacing 1 billion gallons of gasoline in 2004.

The Treasure Valley coalition has already helped bring a fuel pump dispensing E85, a mixture of 15 percent gasoline and 85 percent ethanol, to Boise. Two other Boise pumps sell biodiesel to business fleets, and 11 stations sell biodiesel-blended fuel to the public.

Currently, 33 stakeholders have joined the Treasure Valley CCC to help do their part to reduce the use of petroleum. Stakeholders include the cities of Boise, Meridian, Eagle, Kuna, and Nampa; the Energy Division, Department of Environmental Quality and several private businesses, utility companies, and not-for-profit organizations.

Established in 1993 in response to the Energy Policy Act of 1992, the coalition partnership provides tools and resources for voluntary, community-based programs to reduce consumption of petroleum-based fuels.

By joining the national coalition, the Treasure Valley CCC hopes to help improve the valley's air quality by developing alternative fueling infrastructure, purchasing or retrofitting vehicle fleets, and providing other petroleum reduction strategies.

EPA/DOE Release Top Fuel Economy Lists for 2007 Models

The U.S. Department of Energy and the U.S. Environmental Protection Agency have released the 2007 Fuel Economy Guide to help consumers make well-informed choices when purchasing new vehicles.

"Each year millions of Americans buy new cars, and by using fuel economy information, each consumer can make a more educated decision that will help conserve energy and save money," Energy Secretary Samuel W. Bodman said.

In addition to looking at the miles-per-gallon rating, Bodman encourages Americans to buy flex-fuel vehicles, which are also good for our economy because they use homegrown E-85.

Data shows that hybrid vehicles continue to lead the government's fuel economy ratings. This year's Toyota Prius, Honda Civic, Toyota Camry Hybrid and Ford Escape Hybrid FWD models top the list. Hybrid technology can be effectively used to improve fuel economy, as other models leading the list include the Toyota Yaris, Honda Fit, Toyota Corolla, Hyundai Accent, Kia Rio, Ford Escape 4WD Hybrid and Mercury Mariner Hybrid 4WD.

Fuel economy estimates, which appear on the window stickers of all new cars and light trucks prior to sale, are determined by tests that manufacturers and EPA conduct according to EPA specifications. This year's label values are based on the same test methods that have been used in recent years.

However, to ensure these estimates continue to remain as reliable as possible, in February EPA proposed changing the methods to better reflect what drivers are experiencing on the road. EPA expects to finalize these changes in time to take effect with 2008 models.

The joint DOE-EPA Fuel Economy web site, www.fueleconomy.gov , offers detailed information on vehicle fuel economy, including a complete downloadable version of the Fuel Economy Guide.

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